DOCUMENT RESUME

ED 105 170 CE 003 440

AUTHOR Soper, Joan, Ed.
TITLE Career Education--An Idea Book for Mathematics Teachers.
INSTITUTION East Providence School Dept., R. I.
PUB DATE [72]
NOTE 33p.; For related documents, see CE 003 437-441

EDRS PRICE MF-$0.76 HC-$1.95 PLUS POSTAGE
DESCRIPTORS Career Awareness; *Career Education; Elementary Secondary Education; *Guides; *Instructional Materials; Integrated Activities; *Integrated Curriculum; Interdisciplinary Approach; Learning Activities; *Mathematics; Mathematics Curriculum; Mathematics Instruction; Occupational Clusters; Teacher Developed Materials; Vocational Development
IDENTIFIERS Career Exploration; Rhode Island

ABSTRACT

The book contains a series of career-oriented ideas for mathematics teachers, contributed by teachers in the East Providence Career Education Project. The ideas are the basis of the interdisciplinary contracting system for grades 7-12 in three pilot schools. They are classified by occupational clusters, which the teachers can use to incorporate their academic skill development with career exploration and development. The ideas are meant to be adapted to any grade level and incorporated into the teacher's particular teaching style, classroom organization, and student needs. The occupational clusters integrated into the mathematics curriculum are: agribusiness and natural resources, business and office, communications and media, construction, consumer and homemaking, environment, fine arts and humanities, health, hospitality and recreation, manufacturing, marine science, marketing and distribution, personal service, public service, and transportation. Each idea is numbered separately and is presented in a one- or two-sentence format. (BP)

ED105170

Career Education—
an idea book for
Mathematics Teachers

Ideas Contributed By:

Peter Allen
Nicholas Acquaviva
George Brown
Dolores Loiselle
Jacob Smith
Samuel Wolstencroft

Joan Soper, Editor

Teachers - East Providence, R. I.
Career Education Project

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

CE 003 440

East Providence School Department

Edward R. Martin
Superintendent

Introduction

Career Education is a system which attempts to integrate career awareness and exploration activities with traditional academic learning. It is, most simply, a motivational technique which uses a student's interests in occupations and the world outside of school to teach him the basic communication and cultural skills for which the schools are responsible. Of course career education has its own set of career development objectives. However, the academic teacher who becomes adept at integrating the exploration of careers with the learning of his subject will attain both his academic objectives and his career development objectives.

Most teachers have been trained in the traditional approach of giving direct information to the students about their subject with little or no relation of its application to the world outside of school or to the adult life of the student. As such, many teachers who enter career education programs ask, "How can I integrate my academic area with career activities?"

The integration process is a fairly simple one. There are two elements to the integration. The first is the selection of the particular academic skill which is to be taught. This can be determined by group or individual needs. The English teacher may want to teach outlining or punctuation; social studies may be teaching cause and effect relationships; science, data collection techniques of the scientific method and math may be teaching the use of percents. The second step is to help the student(s) select a career related activity through which the skill can be learned.

Most teachers know the list of skills for which they are responsible, but do not know career activities with which to integrate these skills.

This book contains a series of career oriented ideas, classified by occupational cluster which teachers can use to incorporate their academic skill development with exploration and career development.

The ideas included in the booklet are not stated in behavioral objective form, they do not include criteria, or conditions for measurement as they are meant to be seed ideas which teachers can adapt at any level to their particular teaching style, classroom organization, and the needs of their students.

If you are wondering what to do to integrate transportation occupations, read through the transportation section until you find those that you feel best meet your needs, then develop your own method of delivery and evaluation.

The ideas in the booklet were contributed by teachers in the East Providence Career Education Project, East Providence, Rhode Island. They are the basis of an interdisciplinary contracting system for grades 7-12 in three pilot schools. For further information about this system write to:

James F. Ryan
Project Director, Career Education
East Providence School Department
255 Taunton Avenue
East Providence, Rhode Island 02914

We hope that this booklet and the series of which it is a part, will be a useful resource to you in developing a successful career education program.

Agri-Business & Natural Resources

1. Compare the costs of running a state, national, or private park.

2. Determine the cost of keeping a forest disease and pest free.

3. Make a cost estimate for setting up of a drilling rig for oil.

4. Determine the cost of breeding, raising, feeding, and management of a herd of animals.

5. Draw a map using your own scale of the area destroyed by the forest fires in California in the fall of 1971. Estimate the acreage destroyed.

6. Choose a particular crop which may be grown in six different parts of the U.S. Draw a line graph of the length of time it would take for the plant to produce a marketable crop in each location.

7. Draw a graph illustrating what % of total power is produced by these (or other specific sources: hydro-electric power, coal, oil, and gas.

8. Choose ten different varieties of trees; construct a bar graph indicating the height each will attain at full growth.

9. Determine how many trees must be cut down to service your school department with paper for one school year.

10. Make a 5 minute presentation on the seismograph and the Richter scale.

11. Prepare an estimate for drilling an artesian well.

12. Compare the costs of having a hydroelectric plant run by the state, federal government or by a private concern.

13. You wish to open a nursery, interview a nursery owner and develop a list of materials and equipment needed to open this nursery. Price this list.

14. Determine the cost of planting, cultivating, and harvesting a particular crop.

15. Design a saw mill operation and calculate the cost of running the operation.

16. Compare the costs of exploring for oil to the cost of exploring for natural gas.

17. Find the cost of constructing fire control structures to preserve our forests.

18. Find the total acreage of state and national parks. What % of state and national land acreage is involved?

19. Use world almanac. List world crop production of 10 crops in billions of lbs. find (a) largest crop, (b) starting with largest--list in order, (c) smallest, (d) which two most nearly equal in size, (e) compare amounts of corn and wheat, and (f) compare potato and rice.

20. Find out what % of the total area in New England is used for National Parks.

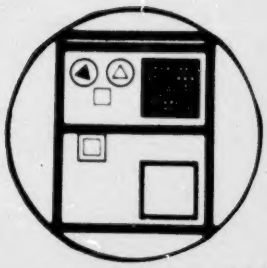
21. You own a lake and wish to develop it as a fishing camp. Design this camp and determine how much money would be needed to finance this.

22. Choose six varieties of fish; construct a table of percents showing hov many eggs each lays in relation to how many young actually survive.

23. Construct a booklet which clearly explains the use of a seismograph.

24. Construct a line graph showing the relative size of the U. S. Indian population over the past 200 years.

25. Determine the cost of raising a piece of livestock from birth to the slaughterhouse.



Business and Office Occupations

1. List 20 different items found in a men's clothing store and their selling price. Markdown 18%. What is sale price of each of the items?

2. Make a chart showing the use of time by an executive secretary for a week.

3. Develop a numerical filing system.

4. Compute the payroll for a small office using tax charts and payroll forms.

5. Make a computer program and run it through a computer.

6. Bring in, or make, an abacus. Show how it works.

7. Give two specific instances when it would be best to use each of the following: personal check, money order, certified check, telegraphic money order, cash, postal money order, express money order, cashiers check, travelers checks.

8. Explain how "on-off" or binary number system works on a computer. Explain one other number system.

9. Conduct a taped interview with a legal secretary to determine the types of mathematical skills she needs to perform her job.

10. Conduct a taped interview with an income tax auditor to determine the types of mathematical skills he needs to perform his job.

11. Design a booklet which clearly explains how language is converted into computer language.

12. Locate at least three businesses in your area which employ computer programmers; write a brief report on each of the three relative to their required tasks.

13. Interview student relative to the mathematical skills he/she had to learn to pass bookkeeping. Prepare a slide sequence illustrating these skills.

14. Write a short report about the financial requirements for obtaining and retaining a dealership operation.

15. Write a short report about the financial requirements for obtaining and retaining a franchise operation.

16. Given appropriate information, fill out a payroll register.

17. As a payroll clerk, prepare a payroll for 10 employees that work for your company.

18. You are asked by the principal of your school to prepare a profit and loss balance sheet for 1 month on the items sold in the office. You accept the challenge.

19. Set up a sale in your store so that 20 items in your store will be reduced 10 to 25%. Set up items, their cost, and sale price.

20. Procure from the local post office a parcel post rate table and find the cost of sending five packages of specific weights to five different cities throughout the U. S.

21. Interview the school secretary and find out how she uses math in her job.

22. Convert a simple information input message into binary language for feeding into a computer.

23. Design a basic computer for addition of single digit numbers.

24. Draw a bar graph comparing length of time for ten different activities done manually as compared to the length of time for the same activities done by a computer

25. Report on the system used to keypunch cards.

26. Make out the payroll of a company that has 25 employees, given their hourly wages and the number of hours the person works.

Communication & Media

1. Determine the cost of installing and maintaining a telephone system for an office of at least 10 people.

2. Compose a newspaper page and determine the cost of composition.

3. Estimate the cost involved in building your own radio.

4. As a commercial photographer, you are hired to do a wedding. Estimate the price you would charge to break even.

5. Draw a cartoon of at least three frames which illustrates some mathematical concept or activity which you have experienced or observed.

6. Construct a slide sequence illustrating the basic operational concepts of a computer.

7. Construct a slide sequence of the skills required in programming a computer.

8. Tape an interview with a computer programmer, to find out what his mathematical background is and what math skills he uses in his job.

9. Take an interview with a layout man from a local newspaper; you are interested in finding out what mathematical skills are necessary to lay out one page.

10. Collect from newspapers or magazines, articles or headlines about "averages". Explain: median, mean, and mode.

11. Find cost and speed of delivery of: cablegram, collect telegram, day letter, full rate telegram, night letter, prepaid telegram, telegraphic money order. Make a graph to chart your findings.

12. Investigate what math is needed to become a TV programmer.
Set up a one-day T.V. schedule including times, commercials, news, sports, programs.

13. Develop a three-minute cartoon that can be video taped that illustrates some operation in mathematics.

14. By use of a model or scale drawing show how man is able to communicate with men on the moon. All math is to be expressed in scientific notation.

15. Make a silk screen illustrating the four basic operations in mathematics.

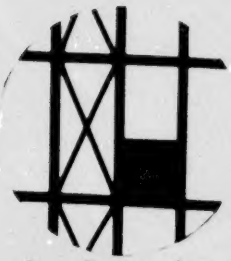
16. Prepare a five minute video tape showing the use of math in the radio and T.V. fields.

17. Present schematic diagram of how voice and picture are transmitted from speaker to T.V. set. All math is to be expressed in scientific notation.

18. Prepare a layout for a two-page ad for a local newspaper to show the use of mathematics in the communication field.

19. As a photographer, you need a dark room. Estimate the cost of setting up your own dark room.

20. Compare the costs between a silk screen process and a printing process.



Construction

1. Determine the price of installing wall-to-wall carpeting in a new home.

2. Estimate the cost of painting a house. Pick exterior, interior, or both.

3. As an electrician, estimate the cost of wiring a house.

4. Estimate the cost of shingling a building of your choice.

5. Estimate the cost of putting aluminum siding onto a house of your choice.

6. Design a community park and estimate the cost of building it.

7. You are going to construct your own house. Make a plot plan of your house on your lot using the scale 1/4" - 1'.

8. Draw scale model, 1/4" = 1', of a swimming pool 30' x 75' with a 5' border. Also a pool 45' x 75' with a 5' border on ends, and 10' border on sides. Calculate how many gallons of water it will take to fill each pool.

9. Make a scale drawing of any two rooms in a house using an architect's ruler for making the scale.

10. On a house of your choice design landscaping suitable to the surroundings of the house to a scale of 1/4" = 1'. Determine estimate of material and labor.

11. For a house 20' x 20' determine the number of 2 x 4's that would be needed to build it. Also determine the number of board feet needed and the total price for this material.

12. Make a schematic drawing to show proper pitch of pipes for drainage purposes from sink, toilet, bath tub, washing machine, and dishwasher.

13. Construct a scale model of the solar system, the sun being represented by a sphere 2 feet in diameter. Using a scale adopted (866,000 miles = 24 inches, calculate the diameter of the other planets and their distances from the sun.

14. Obtain a piece of heavy clothesline. Cut in lengths of an inch, foot, yard, and rod. Paint each piece in a bright color and label each. Hang them on the wall at the front of the classroom.

15. Lay out a six-room house. Find the square footage of wall paper required for each room.

16. Tape an interview with a contractor to find out his total expenses as he builds a house on speculation.

17. Draw a scale drawing of the parts needed to erect the shell of a prefabricated house.

18. Draw a graph showing the number of feet of wire an electrician would need to wire a room as compared to the size of the room.

19. Tape an interview with an electrical wirer as to the mathematical skills necessary to perform his job.

20. Make a chart indicating what price a homeowner could afford to pay for a home in at least five different earning brackets.

Consumer & Homemaking

1. You are overweight. Make out a menu which you can follow so that you can lose the required amount of weight.

2. Set up a cash register to practice making change for a list of items that may be sold in a store.

3. Design a laundry and estimate the cost of equipping your laundry.

4. Choose a recipe and project the amount of ingredients needed to make it for a banquet of 250 people.

5. Design an article of clothing and project the cost of producing it.

6. Compare the cost of making your own outfit to one which you would buy in a store.

7. You have to plan the menu for a wedding. Determine the price you have to charge to break even on the affair.

8. As an interior decorator, estimate the cost of redecorating a room of your choice.

9. Compare the cost of refinishing a piece of furniture yourself without having it done by a professional.

10. Make a budget for your family for a period of one month and then project it for a year.

11. Compare the costs charged by at least three supermarkets for at least 20 items. Determine where it is less expensive to shop.

12. You are going to paint your house. Estimate outside area (approximate dimensions). How much paint will be necessary and what will be the cost?

13. Compare cost of painting a house with covering it with aluminum or vinyl siding.

14. From newspaper, list 10 items that give % discount. List original cost, amount of discount, and new price.

15. List cost of 10 items of furniture. Down payment is 10% of cost. Balance in monthly payments equal to down payment plus 10% carrying charge of unpaid balance after down payment. Find monthly payments, and how many months to pay.

16. If you had a family of four and could afford to spend $30 per week for food, set up a varied, itemized cost menu (for three meals per day) for one week.

17. Design a booklet which explains to a young child the mathematical skills he needs in baking.

18. Design an article of wearing apparel which employs geometric shapes.

19. Create a slide sequence showing the mathematical skills you employed as you chose a pattern, bought your materials, and actually sewed an item of clothing.

20. Estimate the cost of feeding a child from the time he is born until the day he turns 18.

21. Work the cash register in your school for one week under supervision of the regular cash register operator.

22. You are the dietician for the school. Take a recipe intended to serve 10 and adapt it for 75 servings.

23. You are going to construct your own home, make a plot plan of your home on your lot using the scale 1/4" - 1'.

24. Plan any two rooms with drapes, rugs, furniture, wall paper, etc. using a scale of _____. Develop a material list and cost estimate.

25. Given circles and arcs of circles formed by a compass, design a window using (a) trefoils and (b) quatrefoils.

26. Using one window in the math classroom, make transparencies to simulate stained glass windows utilizing geometric designs.

27. Determine the number of inches of material to curtain the windows in your homeroom. Allow for 100% fulness, double hem 1 1/2" deep, heading and casing.

28. Chart the calories you take in at various times during one day, and the amount spent on different activities and hobby functions on that day.

29. Give the dimensions of ten common containers found in the home. Calculate the capacity of each.

30. Visit a local furniture store which is advertising a 20% sale; choose 10 different items and compute their new sale prices.

31. Draw a circle graph illustrating the distribution of sales for 1971 by departments for a store of your choice.

32. Given $10,000 to invest in the stock market, list the stock or stocks you would buy and chart the money you make or lose on the stocks you buy.

33. You are looking to buy life insurance. Compare cost of ordinary life, 20 payment life, and term insurance.

34. You want to order from the Speigel Catologue. Make out an order for at least 10 items and a total of more than $50.

Environment

1. Determine the cost of recycling one beer can.

2. Make a chart showing the population and demographic trend in your state.

3. Choose a company that is polluting and find the costs involved to remedy the situation.

4. Make a chart showing the amount of air pollution in your city or town over a month's time.

5. Chart the air pollution in your state compared to that of other states.

6. Obtain a sample of polluted water and calculate the ratio of the different minerals you find in the water.

7. Find a method of monitoring the noise level in the high school over a week's time and graph your results.

8. Illustrate on a circle graph, in terms of percent, the contents of alkaline soil.

9. Make a side by side diagram of Fahrenheit, Celsius, and Kelvin Thermometer.

10. In road building, how much do different surface materials expand or contract? What is meant by "grade"? What are the effects on each material from weather, ice, salt and heat?

11. Lay out a scale model site for an airport.

12. Lay out a scale model site for a shopping center.

13. Lay out a scale model for a one-story factory.

14. Figure the cost of supplying your city or town with desalinized water for six months.

15. Draw on a scale of 1" = 1 mile the water shed area for your town which supplies your water.

16. Use two earth samples from different sections of your city or town and illustrate the composition of each by individual circle graphs.

17. Make a chart of the weather and the air pollution level on each day of one month. See if there is any correlation.

18. Draw a proportional sketch of the contents of a beaker of water suitable for human consumption.

19. Illustrate on a circle graph using fractions, the proportion of elements in smog.

20. Chart decibel readings for at least 10 sources of sound.

21. Given that a single tree in the course of a year produces a specific amount of oxygen, how many trees are necessary in your city to support the population for one year.

22. Solid waste collected in U.S. was 2.75 pounds, per person, per day, in 1920. 5.3 pounds, per person, per day, in 1965. Projected, 8 pounds, per person, per day in 1980. In an almanac, find population from 1920, in 5 year intervals. Find and chart number of tons of solid waste for each year.

23. Make a bar graph of the population of your city or town from earliest records to 1970, by 10 year intervals.

24. Lay out a community park. Have 6-foot-wide paths between areas. What is the total square footage of walkways?

25. Investigate the relationship between pH and logarithms and report your findings.

26. Make a list of plants you would like to grow in a garden. Find out how many inches apart each plant should be and how many plants you can grow in the garden.

27. Make a graph of the time of sunrise for one week.

28. Report on the geometric patterns can be seen in certain minerals.

29. Contact you oil service man to inquire about what math the employees need to know to service customers. Ask how he keeps track of when to deliver oil to his customers.

30. With the help of your science teacher collect 5 samples of water and test them for pollution. Chart and report on your findings.

31. Prepare a window display on smog showing the different levels of air pollution on a scale and the effects on a person at each level.

32. As a weatherman collect data on the temperature (high and low) and find the average temperature (high and low) for a particular month.

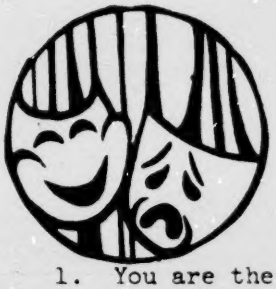
33. Visit the city clerk, study the birth and death records, and graph your findings for each of the last 5 years.

34. As a member of the planning board design five areas, drawn to scale, that might be used for future parks.

35. As a person who likes quiet, survey the school on 10 successive days at 5 different points and graph the noise levels for these days.

36. You are a member of the recreational board. Plan, design, and prepare a cost estimate for a park in town to be used for recreation, playground, and athletic fields. You have 125,000 sq. ft. and $150,000.

37. Write to a leading car manufacturing company to get the latest mathematical data on engine pollution and prepare a report for the class.



Fine Arts & Humanities

1. You are the manager of the Rolling Stones. Calculate the money you have to make on a concert to break even.

2. Write a report on how art collectors appraise different pieces of art.

3. Create a new fashion design and estimate the cost of having your design produced.

4. Create a piece of art using at least 10 geometrical shapes.

5. You want to put on your own play. Pick the play you want to produce and find the cost of the sets you need to make the play a hit.

6. Your band has just written a song. Find the cost of getting your song recorded and played on the radio.

7. Sketch a famous sculpture and describe the proportions of the different parts.

8. You have just written a book which you want to publish. Determine the cost of publishing your book.

9. Compose an eight measure song using 3/4 time.

10. Sketch a stage in scale 1" - 1 ft.

11. Report on how math is involved in the production of sound.

12. Make patterns for model of a cube, right triangular prism, parallelopiped, and 6 other figures. Construct, using heavy paper, glue, scissors, and ruler.

13. Using protractor, compass, ruler, colored pencils: inscribe a square in a circle. Create a 2-color design showing balance and symmetry.

14. Design an article of clothing using geometric forms.

15. Write a report and prepare a slide sequence on how Buckminster Fuller uses the equilateral triangle in his architectural creations.

16. Set a poem with a definite meter to a suitable tune.

17. Choreograph an original dance to demonstrate the operation of addition to elementary school children.

18. Make a block print that would be suitable to put on a notebook cover to illustrate mathematics.

19. Make 4 models of conic sections from clay.

20. Collect a bagful of assorted tiles and make a geometric design by glueing the various pieces on cardboard.

21. Make a string model of a conic section.

22. Make ten charts showing the numbers 1 to 10 in Chinese characters.

23. Make a chart showing the numbers from one to ten in 10 different languages.

24. Using geometric shapes, design a pattern for draperies to be used in a modern home.

25. Using geometric shapes, design a pattern for a floor covering.

26. As an interior decorator, estimate the cost of redecorating a room of your choice.

27. Sketch the basic components of a computer; put these basic components together in a sketch of the computer itself.

Health Occupations

1. Determine the average cost per patient in different areas in a hospital. Project this cost for a year's time if the hospital is filled to capacity.

2. Calculate the cost of having a baby from the first day of conception until the baby and mother come home.

3. Show how to calculate dosages of medicine given to patients on your floor of the hospital if you are a nurse.

4. Construct a graph which shows the conversion of degrees Centigrade to degrees Fahrenheit. Then take a person's temperature over a period of time and chart the results.

5. Design and make an orthopedic brace for a person's back, leg, or arm. Calculate the cost to make your device.

6. List 1/2 hourly temperatures for a 24-hour period. Make a graph.

7. Make a chart of the population growth of the U.S. at 10 year intervals from 1790-1970.

8. Make a chart of population growth in Great Britain, India, Sweden, Ireland, USSR and China, at 10 year intervals, from 1790-1970.

9. Using census, almanac, or atlas, find birth, death, marriage, and disease rates for 1790, 1830, 1880, 1930, 1945, 1960, 1970, in the U.S. Make charts and graphs to illustrate.

10. Chart the infant mortality rate since 1790 at 10 year intervals. Report on what advancements in medicine have caused a drop in the rate.

11. Interview a dental technician and find out how he uses math in his job.

12. Prepare a taped interview with a prosthodontist as to the uses of math in his business.

13. Construct a table showing the correlation between the no. of lbs. a person is overweight and the possibility of his having a heart attact.

14. Conduct a taped interview with a pharmacist as to how he employs mathematical skills in preparing prescriptions.

15. Prepare a 15 minute video tape program on the use of mathematics in the health fields.

16. Visit the fire department and report on the number of calls made by the Rescue Squad in a one-week period. Graph the number of calls made each month for a year.

17. Visit a hospital and prepare a 10 minute interview on how math is used by an X-ray technician or lab technician.

18. Using graphic arts, prepare a display case showing the use of mathematics in the health professions.

19. Prepare bar graphs showing gross national product for 5 year intervals, 1945-1970; life expectancy; population; infant mortality rate per 100,000; production rates for major industries; number of physicians per 100,000; number of hospitals per 100,000; dentists per 100,000 for USA, USSR, India, China, Brazil, Great Britain, Japan, Pakistan, Jordan, Israel, Philipines. Compare GNP, industrial production, health status of any two countries.

20. Make a chart comparing five brands of cereals according to their nutritional values.

21. Find height, weight, age of students in your home room. Find average of each.

Hospitality and Recreation

1. Determine what percent of the total area in the United States is devoted to recreational facilities.

2. Construct a children's game which will teach some mathematical skill.

3. Pick your favorite professional sport and determine how statistics are kept. Show how you would determine the averages for a particular player.

4. You are to build a recreational area. Give at least ten mathematical skills needed in order to properly landscape this area.

5. You are the recreation director for a youth agency. Set up your recreation program for the summer months and determine the cost of running this program.

6. A company is polluting your favorite swimming place. List the costs involved in installing equipment to stop the pollution.

7. Calculate the exchange rates for American to foreign currency using at least 20 specific examples.

8. Find the cost of building your own golf course.

9. The student will calculate the percent of window space in an A-frame house; calculate the percent of window space in a standard ranch; compare the two homes relative to their window space.

10. Design a usable Jungle Gym which would employ a minimum of three geometric forms.

11. For a party of 50 adults, plan the amount of food necessary. Calculate the cost.

12. Draw a map using a scale of one inch to 20 miles of the distance between New York City and Providence.

13. A league bowls a 30-week season. Use 20 team leagues, 5 men to a team. Figure fees, prizes, mid-year banquet, end-of-year banquet. What must each man pay per week?

14. Toss a coin 1000 times. Record the number of heads, the number of tails. What are the odds on each toss? How close do you come to 500 heads and 500 tails?

15. Draw a scale diagram, 1/8" to 1' of a site for" archery, badminton, baseball, basketball, bowling, football, handball, horseshoes, ice hockey, lacross, pistol & rifle range, roller skating, shufflehoard, soccer, speedball, tennis, volleyball.

16. The forest service of U. S. Department of Agriculture lists 154 national forests. On a rough map of U. S. lay out a motor trip to 10 of these. Include details of expected costs e.g. gas, food, lodging, or camping mileage, etc.

17. Borrow a roulette wheel and figure out the probabilities of all possible outcomes.

18. Bring in a pair of dice and work out the probabilities of all possible outcomes.

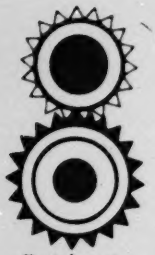
19. Find out what math is needed in silk screen lay out.

20. List the monies allocated from the city budget concerning recreation for the last 5 years. Calculate the percent of increase or decrease for each year of this period to the nearest 1%.

21. Graphically represent the expenditures for Green Acres and Natural Resources from your city budget for the last 5 years and on the basis of this graph project the expenditures for the next 2 years.

22. Compute the total expenses of a two-week tour of a foreign country.

23. Estimate cost of financing a high school baseball team.



Manufacturing

1. Estimate the cost of operating a local battle-recycling plant.

2. Make a video-tape of an assembly line showing the number of people needed to produce that particular article and the number of finished articles produced in one hour.

3. Prepare a list of mathematical considerations you would need to construct packaging for an item of your choice.

4. Construct a bar graph of the monthly production units for a local manufacturer for one year.

5. Construct a line graph of the percent of the total number of articles begun at a company damaged during production and/or packaging for each month during the past year.

6. Design a piece of jewelry using a combination of geometric shapes.

7. State the general formulas for levers, inclines, and wedges. Give the mechanical advantage formulas for each, and an example of each.

8. State general formulas for screws, windlasses, pulley blocks, and worms. Give mechanical advantage formulas for each. Give example of each.

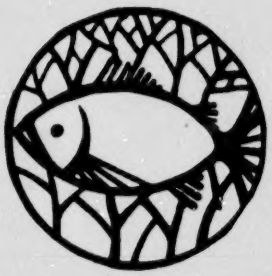
9. You are designing a pattern for a puzzle made out of geometrical shapes, which should include 10 recognizable simple geometrical shapes. The puzzle will have an outside dimension of 1' on a side.

10. Design a piece of jewelry and determine the cost to have it produced.

11. Compare an assembly line operation to a job where one person does the complete assembly. Compare the costs of running the two operations.

12. Make a one cylinder engine that gives you maximum horsepower.

13. Make a cost estimate of mass producing 100 objects made by you in Industrial Arts or Home Economics. Figure in your estimate overhead, cost of materials, and unit price to make a profit.



Marine Science

1. Prepare a graph depicting legal sizes for at least 15 types of fish.

2. Obtain a map of the Rhode Island sea coast and make a chart showing the relative depth of the ocean bottom out to the continental shelf.

3. Describe the three variables upon which the densing of sea water depends. Use a slide rule to determine the other mineral content.

4. Make a set of rings to determine the legality of removing shell fish from the water.

5. You want to open a charter boat operation. Determine the initial cost of setting up your operation.

6. Make your own sextant which is to be used for navigational purposes.

7. Compare the different types of commercial ocean fishing to determine the cheapest type of operation.

8. Report on how to find your position at sea.

9. From newspaper ads, or visits to fish markets, keep a weekly chart of price per pound of at least 10 species of seafood.

10. If you owned a boat of particular size, and it sank, prepare a cost analysis for raising the boat and making it operable.

11. Prepare a bar graph showing the relative number of square pounds of air pressure needed in air tank flotation devices to raise at least 5 different objects.

12. Compare, using a bar graph, the relative weight of fish with the test line needed to catch it.

13. Prepare a soil sample adequate for growing house plants; concentrate on the appropriate percent of each component.

14. Diagram time differences around the world.

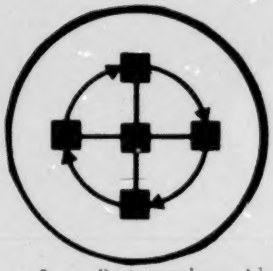
15. Plan a charter boat party for 30 people. Cost of ticket to include rental fee, bait, gear, food, etc.

16. Prepare a cost estimate on buying and running your own trawler.

17. Present a 10-minute video-tape presentation on the use of sonar.

18. Write to the Oceanography Department of a university and inquire as to the use of math in oceanography. Prepare a display of this material.

19. Calculate how much it costs to send something by boat compared to air freight.



Marketing & Distribution

1. Determine the difference in weight for small, medium and large and extra large eggs.

2. Compare the costs between business and property insurance.

3. Determine the cost of refining a quart of oil.

4. You want to open a mail order house. Estimate the cost of opening your own firm.

5. Determine the cost of getting your farm product to the market after harvest.

6. You are in the export business. Determine the cost of sending different items overseas. List at least 10.

7. Compare consumer credit to commercial credit to determine which is cheaper.

8. You are going to start working as a teller. Practice making change and the other skills you must have.

9. To simulate a warehouse problem, calculate the space needed to store the schools AV equipment as efficiently and economically as possible.

10. Make a chart of sales taxes which could be used by sales personnel if the sales tax were 6%.

11. You are a cashier in a local store. Design a booklet which would explain step-by-step to your classmates your procedure for calculating the correct amount of change for a customer.

12. You are a clerk in an insurance office. Prepare a booklet illustrating the mathematical skills you need.

Personal Service

1. Estimate the cost of establishing and equipping a three chair barber shop. Include a price list for the services offered.

2. You wish to open a health spa. Estimate the cost of establishing and equipping your health spa.

3. You want to be a mortician. Estimate the cost of establishing and equipping your funeral home.

4. Determine the cost involved in establishing and operating a pet shop. Be sure to include a list of pets.

5. Make a budget for the operation of an obedience school.

6. Suppose you want to buy a pet for yourself. Compare the costs involved in owning different pets and decide which one you could best afford to take care of.

7. Compare the costs involved when a person is cremated to the costs of a traditional burial.

8. You have just developed a new line of cosmetics. Estimate the cost of having your line produced commercially.

9. Create an advertising campaign for one of the personal services. Determine the cost of running your campaign for a month.

10. You want to establish a kennel. Estimate the cost of establishing, equipping, and operating your kennel.

11. Prepare price list for beauty parlor services. Determine the cost of equipment and supplies for a beauty parlor.

12. Calculate the cost of feeding a dog of your choice for one year.

13. Determine how much you could save if you clipped and manicured your own French poodle over the course of one year.

14. Draw a bar graph of the comparative costs for a man's shave'n a haircut over the past 25 years.

15. Make an itemized cost list of equipment and supplies necessary for you to open your own reducing salon.

16. Draw a scale model of a kennel and prepare a cost estimate of the equipment needed.

17. Ask the girls in your class for an estimated itemized list of items and associated costs for cosmetics which they buy in the course of a year. Compute the average amount devoted to each item.

18. What is the average measurement of the flexed biceps of all the boys in the class.

Public Service

1. Make out Federal and State tax forms for your wages or your family's.

2. Prepare a loan form for a purchase of a car bought from a local car dealer which is to be financed by a local bank. Determine all finances including loan repayment, sales tax, registration and insurance.

3. Determine the cost of the city per sq. foot to construct a road. Prepare a graph showing what percentages of the total are devoted to each item such as materials, salaries, etc.

4. Determine the average number of gallons of water consumed by the average family in your area. Calculate an average water bill.

5. Determine the size bond which must be posted in relation to the seriousness of the crime committed. Draw a graph charting these two variables.

6. Tabulate by graph (or other) the costs (tuition, fees, room, board, etc.) for in-state and out-of-state residents at four accredited liberal arts colleges for 1972. How do these figures compare with 1952 and 1932?

7. You are a guidance counselor assisting a student planning to work his way through college. What funds will he need for 1st semester? Make a schedule for hours of work, study and recreation.

8. Graph yearly traffic on various toll bridges in your state. After finding out the toll charges for each, graph the collections for a year as a means of comparison.

9. Make a chart showing numerical strength of the labor movement in five western countries.

10. Make charts showing family income and size in the U.S. at 10 year intervals since 1790. Compare with China, India, South Africa, Italy, France, England and the USSR.

11. Write to the State Department of Education for information on the budget for the coming year. Graph the monies received from various sources and how they are to be allocated.

12. Write to a mayor's office for information on that city's sources of revenue and its allocation of this income. Prepare charts of both for presentation to the class.

13. Make a horizontal bar graph, a verticle bar graph and a circular graph, showing % expenditures of tax dollar in your city or town.

Transportation

1. Make a time schedule and determine the cost of delivering merchandise from Boston to New York for a period of one week.

2. Estimate the cost of building your own service station.

3. Graph the maximum power obtained from an automobile engine using different Air-Fuel ratios.

4. Project or estimate the life of a spark plug when you vary the gap from the manufacturer's specifications.

5. Design an underground rail system for your city and estimate the costs involved in building and maintaining this system.

6. Write a report on the mathematic skills needed to obtain a pilot's license.

7. Make or design a rocket and calculate the amount of thrust needed to make it fly.

8. Compare the costs of buying and maintaining a used car to those of a new car.

9. Make a graph to show what happens when the crankshaft speed is held constant and the spark settings are varied.

10. Make a graph to show the comparison between an automobile engine with a standard head and a high compression head.

11. Find the cost of shipping 1 pound, 10 pound and 100 pound packages to Boston, New York, Chicago, Denver, and Seattle by parcel post, train, bus, truck, and air.

12. Make a bar graph showing "Stopping Distance for Autos" in feet, against miles-per-hour.

13. Determine which is the cheapest way to send 10,000 lbs. of goods from your city to Detroit: rail, air, or truck.

14. You are the launch operator for the next manned space flight. Calculate the speed that will be needed for the spacecraft to leave the earth's gravity.

15. Draw for use in an airport ticket office a time chart for North America, showing time differences and at least 5 major cities in each of these time zones.

16. You are the navigator for a commercial airline. Be able to discuss the meaning of true north and magnetic north and be able to compute the difference between the two.

17. Be able to plot course or position by using latitude and longitude lines.

18. Demonstrate that you can use the following formulas to solve problems: (a) H.P. = (DXV)/550, (b) $L=Cl/2dAV^2$, (c) r=s/c.

19. Get 3 estimates of cost for purchasing a set of tires for your family car and select the best "buy".

20. Determine the geometric shape of the cam of a distributor for an (1) eight cylinder, (2) six cylinder, (3) four cylinder engine.

21. Visit an airport and find out how they determine wind velocity.

22. Find out what one degree of distributor movement is equal to in advancing and retarding the ignition timing to adjust the ignition to varying grades of "regular" or "premium" gasoline.

23. Make a bar graph illustrating the amount of money American Airlines has invested in its different types of airplanes.

24. Determine what % of the total weight of an aircraft can be devoted to baggage.

25. Draw a sketch of an Apollo missile in scale 1" = 1'.

26. Draw a graph illustrating the number of tugs needed to pull a ship into a harbor as compared to the size of the ship.

27. Space ships travel 1800 miles her hour. What is this in feet/seconds? How long would it take to get to each of the planets in our Solar System?

28. Make a distance chart to and from 25 cities in the U.S.

29. Give 5 pipeline diameters. What is the volume per mile? What can each deliver in gallons per minute?

30. Draw a map using the scale 1 in. = 1 mi. illustrating how the gas company pipes its gas into your city.

31. Make a line graph showing what percent of your local airport has been devoted to jet transportation over each of the past ten years.

32. Make a list of the types of measurements used by an aircraft maintenance man.

33. Determine how much fuel it takes per pound to lift an Apollo rocket off the ground at Cape Kennedy.

34. Draw a distributer to scale.

35. Draw a motorcycle crankshaft to scale.

36. Diagram grooves in pistons to scale and give dimensions for new rings.

37. Draw to scale and briefly explain purpose of the five most important instruments in a single engine plane.

38. Make a scale drawing of an auto race track or drag strip. Include pits, tower, stands, etc.